

CLAIMS

1. A limiter comprising:
 - a transmitter producing an output signal having at least two frequency
 - 5 components;
 - a signal divider for dividing said output signal into a first divided signal and a second divided signal;
 - a first stimulated Brillouin scattering medium for receiving said first divided signal; and
 - 10 a second stimulated Brillouin scattering medium, said second stimulated Brillouin scattering medium generating Stokes light in response to said second divided signal, said second stimulated Brillouin scattering medium being coupled to the first stimulated Brillouin scattering medium for providing said Stokes light thereto.
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2. The limiter of claim 1 wherein the stokes light coupled to the first stimulated Brillouin scattering medium propagates in a reverse direction compared to said first divided signal received by the first stimulated Brillouin scattering medium.
- 20 3. The limiter of claim 2 further comprising an optical notch filter, wherein said Stokes light generated by said second stimulated Brillouin scattering medium passes through said optical notch filter before being provided to said first stimulated Brillouin scattering medium, said Stokes light comprises a Stokes wave corresponding to an at least one of the at least two frequency components, said optical
- 25 notch filter removing said Stokes wave corresponding to said at least one of the at least two frequency components before passing said Stokes light from said second stimulated Brillouin scattering medium to said first stimulated Brillouin scattering medium.
- 30 4. The limiter of claim 3 wherein the at least one of the at least two frequency

components comprises Stokes light associated with an optical carrier of the transmitter.

5. The limiter of claim 4 wherein the optical notch filter block Stokes light
5 associated with said optical carrier

6. The limiter of claim 1 further comprising a first optical amplifier for
amplifying said second divided signal.

10 7. The limiter of claim 1 further comprising a second optical amplifier for
amplifying said Stokes light from said second stimulated Brillouin scattering
medium.

8. The limiter of claim 1 further comprising a third optical amplifier for
15 amplifying said Stokes light within said second stimulated Brillouin scattering
medium.

9. The limiter of claim 1 wherein said second stimulated Brillouin scattering
medium comprises one or more optical loops.

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10. The limiter of claim 1 wherein said second stimulated Brillouin scattering
medium comprises a strand of optical fiber having a non-reflective distal end, said
distal end being optically isolated from other elements of said limiter

25 11. The limiter of claim 1 further comprising a modulator for modulating said
second divided signal with a reference input before said second stimulated Brillouin
scattering medium receives said second divided signal.

12. The limiter of claim 11 wherein said reference input is associated with at least
30 one of the at least two frequency components.

13. The limiter of claim 1 further including an optical notch filter and wherein the second divided signal passes through said optical notch filter before being coupled to said second stimulated Brillouin scattering medium.

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14. The limiter of claim 13 wherein the at least one of the at least two frequency components comprises Stokes light associated with an optical carrier of the transmitter.

10 15. The limiter of claim 14 wherein the optical notch filter block Stokes light associated with said optical carrier

16. A method for selectively attenuating frequency components comprising the steps of:

15 modulating an RF signal onto a lightwave carrier creating a RF-modulated lightwave signal, said RF-modulated lightwave signal having at least two frequency components;

dividing said RF-modulated lightwave signal into a first lightwave signal and a second lightwave signal;

20 propagating said first lightwave signal into a first stimulated Brillouin scattering medium;

generating a set of Stokes waves from said second lightwave signal; and

seeding said first stimulated Brillouin scattering medium with said set of Stokes waves, whereby a threshold for said stimulated Brillouin scattering medium

25 may be set lower than the threshold would be set without said seed.

17. The method of claim 16 further comprising removing at least one frequency component from said second lightwave signal before said set of Stokes waves is generated from said second lightwave signal.

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18. The method of claim 17 wherein said at least one frequency component comprises an optical carrier.
19. The method of claim 16 wherein said set of Stokes waves contains a first
5 Stokes wave corresponding to at least one of said at least two frequency components, said method further comprising the step of removing said first Stokes wave from said set of Stokes waves before seeding said first stimulated Brillouin scattering medium.
20. The method of claim 19 wherein at least one of said at least two frequency
10 components comprises an optical carrier and wherein the first Stokes wave is removed before seeding said first stimulated Brillouin scattering medium.
21. The method of claim 16 further comprising the step of amplifying said second
15 lightwave signal.
22. The method of claim 16 further comprising the step of amplifying said set of Stokes waves.
23. The method of claim 16 wherein the step of generating the set of Stokes
20 waves further comprises recirculating said second lightwave signal in one or more loops of a SBS medium.
24. The method of claim 16 wherein the step of generating the set of Stokes
25 waves further comprises propagating said second lightwave signal in a strand of optical fiber having a non-reflective distal end, said distal end being optically isolated from other elements of said limiter.
25. The method of claim 16 further comprising the step of modulating said second
30 divided signal with a reference input before generating said set of Stokes waves.

26. The method of claim 25 wherein said reference input is associated with at least one of the at least two frequency components.

27. A filter for selectively attenuating frequency components of a signal, the filter
5 comprising:

a modulator for modulating the signal onto a lightwave carrier creating a RF-modulated lightwave signal, said RF-modulated lightwave signal having at least two frequency components;

a splitter device for dividing said RF-modulated lightwave signal into a first
10 lightwave signal and a second lightwave signal;

a first stimulated Brillouin scattering medium coupled to receive the first lightwave signal ;

means for generating a set of Stokes waves from said second lightwave signal;
and

15 means for seeding the first stimulated Brillouin scattering medium with the set of Stokes waves.

28. A method for selectively attenuating the intensities of strong RF components occurring in at least one modulation sideband of a RF signal wherein the at least one
20 sideband has more optical power than other sidebands of said RF lightwave signal, said method including:

modulating an opto-electronic transmitter with said RF signal to produce a RF lightwave signal wherein at least one modulation sideband has more optical power than other sidebands of said RF lightwave signal;

25 passing the RF lightwave signal through a Stimulated Brillouin Scattering (SBS) medium having a given SBS interaction length;

selecting the SBS interaction length of the SBS medium so that the optical intensity threshold for SBS is below the intensity of the at least one modulation sideband has more optical power than other sidebands of said RF lightwave signal;
30 and

attenuating the intensity of the at least one modulation sideband has more optical power than other sidebands of said RF lightwave signal as a result of SBS.

29. The method of claim 28 wherein the SBS medium is a length of optical fiber.

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